

WEIR (R.F.)

HERNIA CEREBRI,

FIRST PRIZE ESSAY

OF THE

College of Physicians and Surgeons,

March 10th, 1859.

BY

ROBERT F. WEIR, M.D.

Published by Request of the Faculty.

(Reprinted from the "New York Journal of Medicine" for November, 1859.)

NEW YORK:

THOMAS HOLMAN, BOOK AND JOB PRINTER, CORNER OF CENTRE AND WHITE STREETS.

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*With Respects of the
Author (ahem!)*

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HERNIA (CEREBRAL)

...of ...

REPORT ...

HERNIA CEREBRI

OF

TRAUMATIC ORIGIN;

With a Table of Thirty-one Cases occurring in the New York Hospital.*

BY ROBERT F. WEIR, M.D.

HAVING seen three cases of hernia cerebri during my term of pupilage, my attention was very naturally directed to a somewhat more extended investigation of the subject than is given in the ordinary text-books on surgery. The results of this examination, as obtained from the works of American and European surgeons, together with the statistics of fifty-five cases collected from the medical journals and the records of the New York Hospital, are now presented.

The term hernia, or improperly fungus cerebri (encephalocele), has been given to various protrusions and growths through openings in the skull, whether congenital or accidental in their origin; those arising from the latter cause alone, will be considered in this article. Hernia of the brain, moreover, occasionally occurs from syphilitic caries or absorption of the cranial bones. Mr. Cæsar Hawkins† relates an interesting case of a man aged thirty-six years, having a pulsating tumor five inches in diameter on the upper and posterior part of the head, from the centre of which a roundish tumor, the size of a walnut, projected through the scalp. The patient stated, that two years after the swelling appeared, it became inflamed, and it was twice punctured, giving exit only to a

* A Prize Inaugural Thesis submitted to the College of Physicians and Surgeons, March, 1859.

† *Lancet*, vol. i., 1856, p. 688.

little blood. This was followed by the protrusion of the fungus through the scalp. The tumor was ligatured by Mr. Hawkins with an unfavorable result. A similar case is related by Mr. Stanley* in his paper on hernia cerebri. Of the protrusions resulting from external injury, Guthrie† describes two kinds: one, composed principally of coagulated blood, appearing immediately after or within two days of the injury, and having generally a fatal termination; the second variety is formed mostly of "brain substance," and occurs at a later period; "these protrusions rarely take place, when a considerable portion of the skull has been lost or removed, the brain being then able to expand to such an extent as the inflammatory impulse from within may render necessary." In this respect, Abernethy agrees with him. Mr. Rowe,‡ in the *Lancet*, makes three varieties: the first, arising from coagulated blood; the second, from protrusion of the brain itself; and the third, that form described as a "fungous growth," from the cerebral mass. Of the first kind, Guthrie states that the tumor is composed of blood effused in the substance of the brain, and which becomes more elevated as the inflammation proceeds, and finally protrudes through the cranial aperture; and Abernethy§ relates two cases of like nature, and offers the same explanation, stating that "the tumor is of a dark brown color, and covered generally by the pia mater; the cases are mostly fatal, and die before the fifth day." The true hernia cerebri, or tumor of brain-like substance, as already stated, takes place at a later period than the former variety, and occurs most commonly, when the cranial opening has been of greater extent than the size of one piece of bone removed by the trephine, the dura mater having either yielded directly from the injury, or from subsequent ulceration. It is not, under proper treatment, a fatal, although an extremely dangerous complication.||

Case V. illustrates many points in the nature of this form of protrusion.

Rosanna McQuillan, aged six and a half years, was, on May 22nd, 1856, struck by a brick, receiving a lacerated wound of the scalp, and a depressed fracture of the os frontis situated a little to the left of the median line, and about three-fourths of an inch below the coronal suture. There were present slight symptoms of concussion, as partial insensibility and vomiting, which were relieved by the hemorrhage caused by the removal of several

* *Medico-Chirurgical Review*, vol. viii.

† *Commentaries on Surgery*, 1855, p. 375.

‡ *Lancet*, vol. i., 1850, p. 760.

§ *Surgical Works. Injuries of Head*.

|| Guthrie (op. cit.).

loose spicula. In attempting to elevate the depressed bone, the outer table was separated from the inner, leaving the latter still driven in.

On the 26th, she was first seen by Dr. Buck in consultation, and the operation of trephining was advised and performed, the patient being under the influence of ether. Crucial incisions were made, enlarging the wound of the scalp, and the inner table found fractured and depressed. One disc of bone was removed, and the remaining portions chipped away by means of Lürer's rongeur forceps (a very effective instrument for this and like purposes). The opening thus formed was about two inches long, and one wide.

On the 27th, she was slightly feverish, with moderate acceleration of the pulse; on the 31st, the dressings were removed, and the wound found nearly all united. She continued to improve until June 7th (12th day after operation), when it was noticed that the scalp was elevated, and forced open at the anterior portion of the wound.

June 8th.—The hernia appeared as a pulsating tumor, and the dura mater was noticed to have given way at the anterior corner of the fracture. Pulse frequent. Cerebral functions unimpaired.

June 13th.—Patient weaker. Pulse still frequent. Yesterday the hernia was touched with nitrate of silver in substance. To-day a portion of the tumor, about the size of a half dollar, was sliced off, which apparently consisted of brain substance; slight hemorrhage followed, which was easily controlled. Nit. Argent. was then applied. Discharge quite fetid.

June 14th.—Slight spasms of left side of face observed. Patient weaker and more irritable. Skin hot and dry. Discharge somewhat less, though most profuse in the morning. Arg. nit. reapplied.

June 17th.—(10th of hernia).—Spasms ceased. Pulse full, and moderately accelerated. Excised by ligature and scissors the whole protruding mass, which was about the size of a flattened hen's egg. No pain was experienced during the operation; the hemorrhage was trifling and readily arrested. The exposed surface of the brain was then touched with lunar caustic, and a compress applied by means of a circular piece of thick pasteboard, with several thicknesses of lint interposed, and the whole bound down by a bandage. The portion removed was unquestionably cerebral substance, the gray and white matter being distinctly visible.

June 23rd.—(16th of hernia).—Suffered no ill effects from the compression. Rested well. Pulse 118. On taking a deep inspiration, the brain hollows in to the depth of nearly an inch.

To-day, while removing the dressings, the effort of crying caused a jet of transparent fluid to be thrown from an opening in the centre of the exposed brain. This was repeated several times, and was supposed to proceed from the ventricle.

June 28th.—(21st of hernia).—Since yesterday, when the right side was convulsed, she has been in a comatose state. Pulse 130, and small. On examination of the wound to-day, there was found at the anterior part of the opening in the skull, a depression of the inner table, which was salient, projecting inwards, and sharp and rough on its edge. It must have escaped notice at the operation, although the bone was cut away to a considerable extent; it was at this point that the dura mater first gave way. Two openings, each the size of a goose quill, were seen in the middle part of the cut surface of the brain and through which the watery fluid, though less, still continued to ooze. The patient lingered until one o'clock the next day, dying in convulsions.

No necroscopy was allowed, but from external inspection, it was noticed that the brain had receded from the cranial aperture to such an extent that an egg might have been received into the cavity thus made. The two foramina, above-mentioned, were widened and separated by a narrow band of cerebral substance one-fourth of an inch in width. Through these canals the expanded ventricle could be seen.

The *excised portion* on the tenth day of the hernia, was in a sloughy condition, and was examined microscopically by Dr. Clark (*vide*, p. 302).

Of the third variety, or those tumors resulting from exuberant granulations from the brain, the following is an example:

Case XXXII.—Joanna Murphy, aged twenty-two, was admitted into the New York Hospital, October 26, 1858, with a compound depressed fracture of the skull, caused by blows inflicted with a hatchet in the hands of a person who attempted to take her life. The wound was situated over the left parietal bone, and was about four or five inches long, extending forward in nearly a direct line from the boss of that side. She was much prostrated and delirious from shock and loss of blood. There was also slight paralysis of right arm.

October 27th.—Was delirious all night. Pulse 96, and irritable. Pupils dilated. This afternoon patient was etherized, and two small portions of bone, irregular in shape, were removed. The dura mater, as well as the brain, was found lacerated. Lips of wound were brought together by sutures, and a compress and light bandage applied.

November 6th.—For several days past, she has had increased heat of skin, and a rapid pulse, from 115 to 130. Mind undis-

turbed. To-day, a protrusion about the size of the end of the little finger was observed in the wound ; pulse strong, but not very frequent ; had slight glossal paralysis, shown by inability to articulate distinctly.

November 24th.—Pulse has been 96, and quite full for several days past. The tumor, about the size of a hickory nut, appeared to consist of a mass of exuberant granulations. Paralysis of arm had diminished.

November 28th.—Has had three attacks of pain around the seat of injury, which were relieved by the application of leeches. At this time the granulating mass protruded about a quarter of an inch beyond the surface of the scalp, and was about the size of a walnut flattened. Argenti nitras has been daily applied to it.

December 9th.—Hernia has been nearly reduced to the level of the integument.

From that time the case progressed favorably, and she was discharged cured on the 27th of the month, no paralysis existing, and intellect being clear. She reëntered the hospital a few weeks after for the removal of some exfoliated bone.

The cause of these protrusions has been differently stated. Stanley* says, that to produce a hernia cerebri, "there must be an increase in the volume of the contused parts, caused either by a general distension of the blood-vessels of the brain, or by the addition of some new matter, as of water or pus."

Samuel Coopert† states that "hernia cerebri is a disease connected with deep seated changes throughout a great part of the brain, conjoined with the removal of bone." "The changes alluded to, may be supposed to cause an increase in the general contents of the skull, and thus a disposition to protrusion as rapid as the serum and other fluids are effused."

Brodie‡ also states, that in "compound fractures of the skull, the brain, losing the support which it derives from the dura mater, and having its vessels loaded with blood, would probably protrude in the form of what is denominated a hernia cerebri." Guthrie§ says it arises from a "low grade of inflammation of the brain;" Miller|| with Drs. Laurie and King,¶ ascribe its appearance to "disorganization of the brain by inflammation." Sédillot** says, that the appearance of the hernia is due to the pressure of a distended ventricle: "Dès que le

* Op. cit.

† *Surgical Dictionary*, article "Hernia Cerebri."

‡ *Med.-Chirurg. Review*, vol. xiv., p. 395.

§ Op. cit., p. 380.

|| *Practice of Surgery*, p. 71.

¶ *Ed. & Lond. Monthly Journal*, 1844, p. 465.

** *Méd. Opératoire*, tome 1er, 530.

crâne est ouvert, la pression normale de l'encéphale par la boîte osseuse diminue et la sécrétion ventriculaire augmente sous l'influence de cette cause, et aussi en raison de l'état inflammatoire des parties," and he relates a case where a fistulous opening through the hernia communicated with the ventricle, and when it was open, the tumor did not appear, but when closed the protrusion took place. The case already quoted presents somewhat similar features, though the hernia was not noticed to recede after the escape of the fluid, probably from the fistula being minute, and from its sides readily collapsing. In the "*Compendium de Chirurgie Pratique*,"* the cause of the extrusion, is stated to be due to arterial pressure, and the formation of the tumor to be favored by a narrow cranial opening.

Propulsion from the arteries is adopted as the cause, by Flourens (Arch. Gen. de Med.) and N. R. Smith. Dr. Buck,† in his essay on this subject, asks whether "this disease may not be considered as a salutary resource of nature to relieve the brain (often only temporarily) from the compression which an increased afflux of blood, or the deposition of inflammatory products would otherwise occasion, and by which the function of this organ would be speedily interrupted," and adds, "that in all the cases in which he had an opportunity of making an examination, an abscess was found in the substance of the brain, or upon its surface in the immediate vicinity of the hernia."

Case XLV. is relevant to this point.

Patrick Cochran, aged twenty-four, was admitted into the New York Hospital, December 12th, 1852, with a compound depressed fracture of the cranium which occurred a week previous from a blow received in an affray. The wound was situated over the fronto-parietal suture, and to the left of the median line. Epileptiform convulsions, with other symptoms of compression came on within a few days, and when brought to the hospital, he was in an insensible condition; eyes fixed and staring; respiration stertorous; pulse 50, and intermitting, etc. Trephining was performed the same day by Dr. Halsted, and the depressed fragments either removed or elevated. No immediate improvement in the patient's condition was observed.

December 14th.—Was seized with a convulsion which was followed in a few hours by another. Pulse 68, and intermitting. The next day (15th) his condition was much better; convulsions had not recurred; a hernia cerebri appeared.

* Par Birard, Denonvilliers, et Gosselin.

† *New York Journal of Medicine and Surgery*, 1840.

December 20th.—Pulse 57; still slightly intermittent in character. Hernia has not increased much, and is touched daily with the solid nitrate of silver, and moderate pressure employed.

December 26th.—General condition improved. Hernia has enlarged a little.

January 1st.—The protrusion has diminished; a small compress of sole leather, with a pad and adhesive straps have been used to effect pressure.

January 10th.—Pulse natural in force and frequency. The hernia slowly decreasing.

He progressed favorably, his mental and physical conditions being good, and was discharged cured, March 7th, 1853, having been so long detained in the hospital, to allow some necrosed bone to be cast off. Case LVII. is a very similar one.

That an opening in the skull and dura mater would allow a moderate amount of protrusion from want of support, and disturbance of the circulation by the diminution of the cerebro-spinal fluid (the "water-bed" of Dr. Arnott), the experiments of Magendie, as well as the observations of surgeons, sufficiently prove; while post-mortem dissections equally reveal, that inflammatory products are the chief agents in the extrusion. These products are, commonly, congestion or inflammation of the meninges of the brain, abscess, a distended ventricle, and effusion of blood, either upon or in the cerebrum.

Case II. is illustrative of the latter condition.

P. Delancey, aged 36 years, was admitted into the New York Hospital March 30th, 1850, with a compound depressed fracture of the left parietal bone, with laceration of the dura mater and brain, produced by a blow from a blacksmith's hammer. He was conscious but unable to speak; no paralysis of limbs or face; pupils dilated; pulse 108, full and strong. He was trephined the same day, and the fragments removed, the resulting opening being circular, and about one inch in diameter. The thumb could be passed into the pulpified brain to the depth of about one inch. Patient after the operation sat up, and signified that he felt better; his speech however was not restored; hemorrhage was considerable from the lacerated brain. In the evening, pulse having become more frequent and hard, ʒij of blood were taken from his arm, with relief.

March 31st.—Passed a good night; no pain; pulse 102 and compressible; tongue furred, and drawn to right side.

April 1st.—Is comatose; pulse 140, weak; respiration feeble and labored. On removing the dressings a hernia cerebri was seen, the protrusion being in a softened state and easily de-

tached. A female catheter *was introduced nearly two inches* into the brain, almost without resistance, in the hope of reaching a collection of matter and discharging it. No pus however escaped. He died the next day in the same comatose condition.

Necroscopy.—The dura mater was lacerated to a corresponding extent with the fracture, and through the latter a portion of brain protruded as large as a madeira nut. Under the dura mater a small clot of blood was found below and to the outside of the laceration of that membrane. The substance of the left hemisphere was broken up to the depth of one and a half inches below the seat of fracture, but no pus was seen. The other parts of the brain were apparently healthy.

As exemplifying hernia resulting from inflammatory products, Case IV. is apposite.

Michael Mooney, aged 24, was admitted June 1st, 1848, with a compound depressed fracture of the right parietal bone, which happened two days before from the kick of a horse. Complained of "numbness" of left side. Four days after, he was trephined, and several fragments removed; the dura mater was lacerated, and the brain protruded. On the 7th pulse was 80 and full. Skin dry and hot. VS. ad. zviij .

June 8th.—A slight protuberance noticed in the wound; no change in symptoms.

June 10th.—Had several convulsions confined to left half of body. Intellect clear. Applied slight pressure by adhesive straps drawn across the protuberance.

June 12th.—Convulsions have hourly recurred, during which the pupils are dilated and fixed, and the action of the heart very violent. VS. repeated, and tinct. aconite gtt. j. q. 2h. given. Hernia had slowly increased, and was to day excised to a level with the bone; it consisted of brain matter, the cortical and medullary portions being distinctly recognized. Pressure was then applied by means of a plate of lead the size of the opening on the skull, a few layers of lint being interposed, and over all two thick compresses, the whole being firmly secured by a bandage.

June 16.—But two convulsions since last note; pulse 66. and of natural force. Hernia reappeared to-day from the bandages slipping off during the night; it was reduced by pressure with the fingers, which procedure caused some pus and softened brain to escape. Paralysis of left side has continued.

Became comatose during the day of the 17th, and died on the 18th, at 8 A. M.

Post. mortem examination disclosed an opening in the dura mater, the edges of which adhered to the hernia at its base. Purulent lymph was found around the tumor, which had receded,

and beneath it an abscess capable of lodging the last phalanx of the thumb, extended into the corpus callosum. and to within a finger's breadth of the lateral ventricle; the surrounding cerebral substance was softened. Both ventricles moderately distended with serum. Elsewhere the brain was normal.

In the analysis of the fifty-five collected cases, Dr. Buck's method of investigation is adopted with slight modification.

Sex.—Of all the cases, but six occurred in the female sex, probably from their being less exposed to the sources of injury.

Age.—Of the fifty-five cases, the average age was about twenty years; the youngest case was two and a half years old; the oldest forty-six. Fifteen were twelve years of age or younger; between twelve and twenty years there were nine cases; between twenty and thirty there were nineteen cases; while between thirty and forty-six there were twelve cases. Of twenty-four cases, nearly one-half the whole number were under twenty years of age—forty-two below thirty years. In Dr. Buck's cases, seventeen were twelve years old or under that age, and twenty-six under twenty years. From which it appears that *hernia cerebri* is a disease of more frequency in children and in youth, perhaps from the cerebral circulation being then more active than at any other period of existence.

The *injury* of the head was caused in seventeen cases by falling, or projected bodies, as bricks, stones, pieces of coal, or wood, &c.; in seven by the kick of a horse; in seventeen by blows on the head, inflicted mostly by blunt instruments; in four by the discharge of fire-arms; and in ten by falls from a height, one of which struck upon a projection, and another from falling from a railroad car in motion. It will be observed from the preceding that in forty-six cases the injury was produced by concentrated violence applied by missiles or blows, while in the nine cases where it arose from falls, it is not stated whether or not the patient struck upon any sharp or projecting body.

The *seat of the wound* was in twenty-six cases over some part of the parietal region; in twenty cases in the frontal; in six the temporal, and in two the occipital region; there being nothing peculiar in this respect, as injuries calling for operation occur more frequently on the anterior and superior portions of the cranium than elsewhere.

The *lesions* were as follows: in every case but four, and one in which its condition was not noted, there was more or less laceration of the *scalp*. In one of the exceptional cases (No. XXV.) there was depression of the bony fragments, and the *hernia* did not appear until the 106th day, no particular complication existing with it. In every case save one, in which it is

unmentioned, the *cranium* was broken into several fragments, which were depressed to various depths. In four cases, the opening was noted as being large, and in the cases that were trephined it necessarily could not have been very small; the largest apertures, were, in Case XXXIV. four by one inches, and in Case XXVI. which was three inches in its long, and one inch in its transverse diameter. In glancing over the Hospital cases, in the annexed table, it will be seen that the cranial deficiency varied much in size, in many the aperture being more than one and a half inches in diameter. In one case it was three by two inches in extent. The amount of depression, when noticed, will also be there found. In Case III. the amount of injury received and recovered from is worthy of more extended notice.

R. G. M., aged 15, admitted September 12th, 1842, with severe compound fracture of skull, and lacerated wounds of face, having been thrown from a wagon. On examination, there was found a compound fracture with depression of the os frontis to the left of the median line. In order to elevate the fragments, a small trephine was applied to the inferior part, and by aid of forceps, the depressed portions were taken away, and the largest one, which was triangular, found to consist of the entire orbital ridge of the frontal bone, with its orbital plate. About two tablespoonfuls of brain matter escaped. The same day, pulse being frequent and hard, $\text{̄}xviiij$ of blood were taken from the arm, which was again done on second day to the extent of $\text{̄}xiv$.

September 15th.—Delirious all night: pulse 100, compressible, though before venesection it had been frequent and tense.

September 20th.—A hernia cerebri of a dark brown color had appeared, being about two inches in its perpendicular, and one in its transverse diameter. A compress of eight thicknesses of patent lint of the size of the hernia, was placed over it and confined there by adhesive straps, and over this another thinner compress was secured by a bandage: making thus considerable pressure without causing pain or other symptoms.

September 27th.—Progressed favorably. Numerous portions of cerebral substance have been discharged from the wound; a plate of lead, the size and shape of the opening, was secured by straps, and a roller over the compresses. No cerebral disturbance has at any time shown itself from the pressure.

The disposition of the hernia to protrude ceased soon after the last note. Intellect remained clear, but his sight continued double, from unharmonious action of the muscles around the eye; the wound being healed, he was discharged cured November 17th.

The *dura mater* was lacerated in forty-three cases, uninjured in five, and abraded in one; not mentioned in six. (Vide case LIV. in table.) The *brain* was injured; that is, either lacerated, soft or pulpy in thirty cases. Of these, brain matter either escaped or protruded in eighteen cases. No escape of it, the *dura mater* being lacerated, in two cases, while in eleven, where that membrane was injured, the condition of the organ was not stated.

The *lesions* may also be thus expressed :

Compound depressed fracture with laceration of dura mater and brain,	28 cases.
Of these, in 17 brain escaped; in 11 it is unmentioned.	
Compound depressed fracture a laceration of dura mater,	13 cases.
In one of these, 3iv of blood escaped, in another there was a wound of the longitudinal sinus.	
Compound depressed fracture (nothing else stated),	4 cases.
“ “ “ dura mater intact and in one of which the brain felt softened under the membrane,	4 cases.
Compound depressed fracture, dura mater abraded.	1 case.
Simple depressed fracture : in one the dura mater was wounded and had a clot under it; one the dura mater was lacerated and brain escaped,	3 cases.
Comminuted fracture (simple) depression not stated,	1 case.
Depressed fracture, nothing else stated,	1 case.

The *hernia* appeared in twenty-eight cases on, or prior to the seventh day; in fourteen instances from the eighth to the eleventh day, and in nine from the twelfth to the thirtieth day. It occurred in two cases beyond that time, and in the remaining two cases the date of its appearance is not mentioned. The earliest period of the protrusion was in four cases, at the time of the accident or operation. In four cases it was seen on the second day after the date of injury; in the latest case, No. XXVI. already referred to, the *hernia* was not perceived until the one hundred and sixth day, and in another case it was not observed until the thirty-ninth day. The average time of its appearance including the extraordinary late one, was about ten days; excluding it, renders the average time eight days.

In regard to the nature of the hernial tumors, surgeons have differed much in opinion.

Stanley, Guthrie, Brodie, Erichsen, Nélaton, Miller, Lawrie & King, Buck* and Smith, agree in considering the protrusion

* Op. cit.

to be composed of brain substance in a softened or disorganized condition.

Chelius* and South† speak of it as a mass of fungous granulations, resulting from blood poured out upon, or in the brain. Sir Astley Cooper ascribes it to granulations which form and project through the cranial opening. Rokitsky‡ states that “in hernia cerebri the *brain* is protruded through accidentally arising or intentionally made apertures in the skull and dura mater—in a condition of inflammation or exuberant granulations. Occasionally in consequence of incarceration by the openings in the cranium and dura mater, the hernia becomes sloughy throughout its whole mass, and is thus cast off.” And also in speaking of lacerated wounds of the brain, he says, “that they heal by granulations which fill the chasm with a cicatricial tissue, and which now and then are excessive, and and grow outwards through the opening in the skull, forming the so-called fungus cerebri of surgeons.”

The *protrusion* in twenty-eight cases in which it was examined on dissection or excision, resembled in twenty-two, cerebral substance, the cortical and medullary portions being clearly distinguished. In four cases the hernia consisted of a clean red mass; in one case it was composed of exuberant granulations, and in one other it was “fungoid in its nature, being nothing like brain.” In the remaining cases there was either no dissection, or the reports were defective in this particular.

The excised portions from Cases V. and XIX. were microscopically examined by Dr. A. Clark.§ In that from the former case no more nerve were found, but cells and granules were observed in considerable quantity. It was constituted differently in different portions; one part was composed of granules of various sizes, greatly resembling in structure the diphtheritic exudation described by Brettoneau; another part consisted of granular cells with minute nuclei; and yet another contained cells with large nuclei and nucleoli. “No part of the cranium could produce a substance similar to the second variety.” Dr. Clark says: “It is constituted altogether independent of brain matter.” In the first and second parts single fibres were seen. In Case XIX. the excised portions were twice examined; no brain substance was found under the microscope. The hernia consisted of fibrin and hæmatoidin, and a granular mass mingled with blood-vessels. In neither instance was a trace of the normal elements of the brain found, although on simple inspection the hernia closely resembled cerebral substance.

* Chelius, vol. i., p. 425.

† Chelius, vol. ii., p. 97, note by South.

‡ Pathologische Anatomie, 1855, vol. ii. pp. 488 and 440.

§ N. Y. Journal Med., 1857, vol. i., pp. 83 and 108.

The first specimen that was examined, was in a sloughy condition, being removed on the tenth day of its appearance. May not the gangrenous state of the tumor prevent a recognition of the nerve matter, or may not the contusion or laceration of the brain, together with the results of inflammation, destroy or change the character of the nerve-cells? Further microscopical investigations, however, are needed to settle the question of the true nature of these extrusions.*

In nine cases the hernia reappeared after excision, though probably it did so in many cases in which it is not stated. That the portion first protruded is brain matter, is most likely, but whether the reproduced tumor is of that nature, and whether the amount of internal compression is equivalent to the new extrusion, the records do not reveal.

The *size* of the protrusion varied from that of a hazel-nut to the largest (Case XV.), which was six inches by three and a half in its respective long and transverse diameters, and projected two inches beyond the level of the skull. In nineteen cases the tumor was below the size of a hen's egg; in six it was of the same size; and in twelve it was larger; not noted in eighteen cases. The *discharge* in seven cases was fetid; in three serous; in three copious, the nature of it not being remarked. In two cases pus was discharged; and in three cases there was hemorrhage from the hernia. In one case the protrusion was enveloped by an organized membrane; in three other cases it was covered with granulations; in one case the hernia was "highly vascular and shreddy"; and in another it was of a mottled, maroon color.

Pulsatile movement must necessarily have existed in nearly all the cases, though it is so stated only in a few; in one case, however, pulsation was absent, the hernia being described as a "red mass resembling that found in an acephalous foetus." Also in one case coughing and respiration were noticed to produce no effect upon the tumor.

* In the *Journal* for March, 1859, p. 252, it is stated that Dr. C. E. Isaacs had examined microscopically a portion of a hernia cerebri, and found it to be composed essentially of brain matter.

A portion of a hernia, resembling brain matter, mingled with blood, taken on the second day from its appearance, from a patient now (Oct. 14) at the N. Y. Hospital, was examined by Dr. A. Clark, who reported that it was composed of varicose nerve fibres, both broken and continuous, with the nerve cells unchanged; of blood vessels in abundance, with free and contained blood corpuscles; of a few fatty vessels, and of scarcely any granular matter. He says, "It looks almost like healthy brain matter, except the broken condition of the nerve fibres."

Dr. W. H. Draper, microscopist of the Hospital, also examined a portion of the same protrusion removed on the fourth day, and obtained the same results, with the exception of an increased quantity of granular matter being found.

The *vascular system* was excited in thirty-nine cases. The pulse was slow in three cases from compression, natural in seven, and in six cases there was no note made of its condition. In twenty cases more particularly examined, the pulse before the appearance of the hernia was more or less accelerated in thirteen cases, in three it was slow, in two cases it was not excited, and in the remaining three its frequency or character is not mentioned.

The *cerebral system* was disturbed as evinced by delirium, pain, irritability, rigors, and coma, in thirty-seven instances. Paralysis existed in fifteen cases, convulsions in eight, while both were present in ten cases. In four cases there were no cerebral symptoms, while the intellect remained clear in nine cases. In Case XIX. the patient had between two hundred and eighty and three hundred convulsions of the paralyzed side of the body during the space of four days, the intellect being clear until toward the termination of the disease, which resulted fatally, the patient dying with symptoms of abscess of the brain. In another case the appearance of the hernia aggravated the symptoms. In Case XXX. where the dura mater was intact, the appearance of the tumor through that membrane relieved the symptoms for a few days, and then they returned with renewed violence. In another case where the dura mater was unruptured the patient had no bad symptoms throughout; the superjacent membrane sloughed on the eighteenth day, the hernia at the same time appearing. He recovered. In the other cases no change in the symptoms was remarked after the protrusion took place.

Termination of the disease.—Of the fifty-five cases, thirteen recovered, and forty-two terminated fatally, or about one case in every three recovered; a proportion of recoveries much less than in Dr. Buck's cases, in which about one in every two had a successful issue.* The youngest of the *fatal* cases was two and a half years old, the oldest was forty-six, the average age being about twenty years. Of these there were eleven under twelve years of age, eight between twelve and twenty, thirteen between twenty-one and thirty years, and ten over that age. Of those who *recovered*, the youngest was six years old, the eldest was also forty-six years; the average age was nearly the same as in the other cases, viz., twenty-one years. There were four cases under twelve years, seven between that age and thirty, one was over forty, and in one the age was not mentioned.

Of the *successful cases*, eight had the intellect unimpaired at

* Of his thirty-three cases, seventeen died and sixteen recovered.

the termination of the disease, one had persistent paralysis, the condition of the mind subsequent to their recovery was not noticed in five cases. The duration of the shortest case was twenty-four days from the accident, and twenty-one days from the appearance of the hernia; that of the longest was about five months. Of the *fatal cases*, the shortest duration of any case was three days from the date of the injury; the longest was one hundred and fifty-eight days. From the time of the hernia's appearance, the shortest case was one day, the longest fifty-two days, the average being about seventeen days. Three of the cases died with pyæmia.

Pathological appearances on dissection.—In twenty-seven cases necroscopies were made, and revealed the following lesions; in eight cases recession of the brain was noted though this probably existed in all, from atmospheric pressure. In seventeen cases the brain was soft, pulpy, and disorganized, in one case it was "putrid looking." In eleven cases an abscess (rarely more than one in number), was found in the hemisphere corresponding to the injured side, and generally situated immediately beneath the hernia. In one case where inspection and palpation only were permitted, a sense of fluctuation was detected below the hernia. In another, Case V. the ventricle was seen through external openings. In one case, pus in large quantity was found between the dura mater and the brain; in Case XXV. an abscess containing $\frac{3}{4}$ ix. of pus existed; and in Case XLIX. an abscess holding $\frac{3}{4}$ vj. of pus was found. In six cases the ventricles were distended, perhaps an effect as well as a cause; in twelve cases some inflammatory lesion of the dura mater or arachnoid, as congestion, thickening, or deposition of lymph or pus, was ascertained. In five cases a clot of blood was discovered in, or upon the surface of the brain. The hernia in seven cases was examined after death, in six of which it consisted of softened brain matter; in one case it was stated to be "fungoid in its nature."

The general treatment consisted of bleeding from the head or arm, active purging, the use of cold to the head, mercury, etc., as the urgency of the symptoms required. In Case XI. nothing was done in the way of general treatment, as at the time of the injury there was a free hemorrhage from the wound.

The local treatment, which is the more interesting, consisted of the application of caustics, such as nitrate of silver, sulphate of zinc, nitric acid, both in a pure and diluted state (gtt. xx. ad. $\frac{3}{4}$ j. aquæ), lime water, sulphate of copper, etc.; or by the use of compression by means of either straps of adhesive plaster, or a plate of lead or pasteboard, bound down firmly by a bandage. In a number of cases excision by the knife or

scissors was resorted to, and occasionally the ligation of the mass was employed.

The local treatment advised by European surgeons, is as follows :

Guthrie prefers the use of moderate pressure, such as can be borne with comfort and persisted in with propriety, and looks with disfavor on removal of the hernia either by caustics or by the knife. In two of his cases too firm compression of the tumor produced in one, swimming sensations, pain in the head, and retardation of the pulse ; in another, syncope supervened. He also advises, that pressure should be applied lightly while the protrusion is increasing, but should be augmented when it becomes stationary, and during its diminution and recession.

Miller uses pressure, and considers ablation, except where the hernia is in a sloughy condition, to be inexpedient. The use of escharotics, he thinks, is in no case advisable. In the *Compendium of Practical Surgery*, pressure is recommended, it being doubted whether excision is ever necessary. Asdley Cooper is also an advocate for pressure conjoined with the use of liquor calcis.

Stanley states that when a protrusion of the brain has taken place, the employment of pressure with a view to effect its return into the skull, is entirely out of the question, and confesses that he is unable to determine whether to excise the mass at once, or to allow it to slough away. At the Glasgow Infirmary,* the local treatment consists in support or moderate pressure of the tumor combined with application of stimulating or astringent dressing, as resinous ointments, blackwash, nitric acid lotion, etc. Erichsen slices off the growth to a level with the brain, and then applies a compress and bandage over the part, and considers the treatment extremely unsatisfactory. for if the tumor is shaved off, it commonly sprouts again until the patient is destroyed by the irritation and coma conjoined.

At the New York Hospital, pressure is at first resorted to, graduated according to its influence on the cerebral functions, if this does not suffice, caustics and excision are employed : the latter especially, if the hernia be large. Frequently, the sloughing produced by the strangulation of the mass, is of itself adequate to its removal, and sometimes the protrusion spontaneously subsides. Pressure, in the Hospital, is generally applied by means of a plate of lead the size of the cranial vacuity, placed over the aperture with several thicknesses of lint interposed, and the whole secured by a firm bandage, which serves quite effectually to control any disposition to protrusion of the

* Laurie & King, op. et loc. cit.

tumor. With these means the occasional use of the solid nitrate of silver is combined.

The method of treatment pursued in the collected cases, was as follows: in the whole number of cases, excision was practised seventeen times, in six of which it was noted that no pain was experienced from the operation, in four cases the hemorrhage was slight, while in two cases it was free. Caustics were used in seventeen cases, and no ill effects followed their application in any instance. In thirty-two cases, compression was employed, in six of which disagreeable symptoms resulted, such as coma, vomiting, dizziness, and syncope, and once, facial paralysis; no bad symptoms followed in eleven cases, and in one the patient felt better after the compress and bandage had been applied. In only three cases was the ligature employed, while in thirteen cases, all of which were fatal, nothing was done locally. Ice to the hernia was used in two cases, both of which died.

In the *fatal* cases, forty-two in number,

Caustic, with compression, excision, and the ligature, was used in	1 case.
Caustic, with compression and the ligature, in	2 cases
Caustic, with excision in	1 case
Caustic, with compression, in	2 cases
Caustic, with compression and excision, in	4 "
Compression and excision, in	8 "
Compression alone, in	5 "
Excision alone, in	1 case
Ice applied, in	2 cases
Nothing done, in	13 "
Not mentioned, in	2 "

Or, stated otherwise, caustic was employed in ten cases, compression in twenty cases, excision in eighteen, and the ligature in three. In four cases, pressure was not tolerated, inducing one or more of the before enumerated symptoms. In case XXII. the tumor was excised, and then the surgeon "dug away the mass to below the level of the skull, without any ill effects, though compression was not well borne." In two cases, pure nitric acid was used without any consequent ill effects.

In the treatment of the thirteen *successful* cases,

Caustic, alone was relied on in	1 case.
Caustic, with compression and excision, employed in	2 cases
Caustic, with compression and excision, employed in	4 "
Compression alone used in	5 "
Compression with excision, succeeded in	1 case

In one, dry sulphate of zinc was kept applied to the protrusion without ill consequences.

Tabulated differently, it is found that in twelve cases pressure was used, in three of which, no ill effects arose, in one, it produced vomiting, and in another syncope and giddiness. Caustics were applied in seven cases, and in three, ablation of the tumor was practised.

It is worthy of notice, that in the unsuccessful cases, eighteen were treated by excision alone or combined with other means, or one in every $2\frac{1}{3}$ cases, while in those cases that resulted favorably, only three were so treated, being only 1 in $4\frac{1}{3}$ cases.

On reviewing the results of the post-mortem examinations, it was observed that in seventeen cases, thirty-one per cent. of all, or forty per cent. of the fatal cases, there was either an abscess or a distended ventricle found, and in eleven cases, the abscess was directly below the hernia. A fact bearing pertinently on the plan of treatment practised by Nélaton and Dupuytren. The former in his *Pathologie Chirurgicale* * says, "on a plusieurs fois pratiqué des incisions du cerveau pour évacuer un foyer, et l'on n'a pas remarqué qu'elles aient aggravé les symptômes, loin de là elles ont été quelque fois utiles," and cites the example of Dupuytren, who plunged a bistoury into the brain, evacuating thereby an abscess; "heureuse audace, digne du génie le plus éminent chirurgicale des temps modernes et qui sauva le malade!" exclains Nélaton.

Remarks.—From the examination of the fifty-five cases, it is seen that a fracture of the skull with depression, is the only condition essential to the formation of a hernia cerebri: it is also well known that this disease does not always ensue even in cases most favorable to its appearance, as for instance in laceration and escape of the brain. Dr. Buck, in the examination of sixteen cases of injury without hernia did not detect any peculiarities in the primary injury, "nor," he says, "does a comparison of the symptoms indicative of cerebral inflammation, show the reason of its appearance in some cases, and its absence in others; we find in both inflammation existing, in various degrees."

Concerning the frequency of the occurrence of hernia cerebri, the following may be of some value. In one hundred and twenty-eight cases of various fractures of the cranium occurring in the New York Hospital from 1839 to 1851, there were ten cases of hernia, being about eight per cent., and in fifty-seven operations for fracture of the skull reported in the London and *Edinburgh Medical Journal* for 1844, there were fourteen cases of hernia resulting, or one in every four cases.

* Tome IIe 557, 573.

When considering the proportion of recoveries, it must be remembered that more successful cases are made public than unsuccessful ones, hence, a more reliable ratio is that obtained from the hospital cases, thirty-one in number, in which there were five recoveries and twenty-six deaths, that is to say, about eighty-four per cent. of the cases terminated fatally.

List of the cases and where collected.

- 1-4.—Hospital Records.
- 5.—Practice of Dr. Buck.
- 6-8.—Hospital Records.
- 9.—Lancet, Vol. I., 1848, p. 305.
10. " Vol. I., 1848, p. 306.
11. " Vol. I., 1850, p. 406.
12. " Vol. I., 1850, p. 760.
13. " " " "
- 14.—Miller's Practice of Surgery, p. 75.
- 15.—British and Foreign Medical Review, 1840.
- 16.—London and Edinburgh Monthly Journal, 1841, p. 150.
- 17.—Lancet, Vol. II., 1846, p. 503.
- 18.—New York Journal of Medicine and Surgery, Vol. IV., p. 307.
19. " " " Vol. I., p. 83, 1857.
- 20.—Guthrie's Commentaries, p. 377.
21. " " " " 378.
- 22.—London and Edinburgh Medical Journal, 1844, p. 465.
23. " " " " p. 468.
24. " " " " p. 469.
25. " " " " p. 470.
26. " " " " p. 471.
27. " " " " p. 472.
28. " " " " p. 474.
29. " " " " p. 475.
30. " " " " p. 476.
31. " " " " p. 477.
- 32.—Hospital Records, 1858.
- 33.—Lancet, December, 1858.
- 34.—Medical Times and Gazette, December, 1858.
- 35-57.—Hospital Records.

A Table of Thirty-one cases of Hernia Cerebri, occurring in the New York Hospital from 1837 to 1859.

SEX. AGE.	MODE OF VIOL- ENCE. SEAT OF INJURY.	LESSONS.	DATE OF APPEAR- ANCE AND CHARACTER.	VASCULAR AND CEREBRAL SYMPTOMS.	GENERAL TREAT- MENT. TERMINA- TION.	LOCAL TREATMENT.	POST-MORTEM APPEAR- ANCES.	REFERENCE. SURGEON.
F. 8	Falling piece of timber. Left parietal os.	Comp. dep. fract., with laceration of brain and dura mater. Left parietal os.	7th day. Symptoms relieved by leeches until near end of appearance. Not mentioned.	Pulse strong and frequent. Intellect clear until near end.	VS. Tert. Anisotony. Died 24th day fr. accident, with symptoms of abscess.	Ice applied to tumor.	None.	Hospital Records, 1837. Case 35. Dr. J. Kearney Rodgers.
M. 10	By a gate falling upon him. Left parietal and frontal and sphenoid.	Comp. dep. fract., with laceration of dura mater as a buttress, and escape of brain, forming large opening large.	7th day. Size of brain increased. Consistent with brain substance.	Pain in head, frequent pulse, feb. Consistent with brain substance.	VS. Tert. Anisotony. Died 18th day. Comatose.	Compression with no effect. Excision, and hernia reappeared next day.	None.	Hospital Records, 1838. Case 36. Dr. J. Kearney Rodgers.
M. 27	Fall fr. a height. Left os frontis.	Comp. dep. fract., with laceration of dura mater, and escape of brain, forming large involving orbit. Discharges.	7th day. Large fracture of dura mater, with laceration of brain. Discharges.	Pain in head, frequent pulse, feb. Consistent with brain substance.	VS. Tert. Anisotony. Died 18th day. Comatose.	Compression with no effect. Excision, and hernia reappeared next day.	None.	Hospital Records, 1839. Case 37. Dr. Gordon Buck.
M. 20	From a falling Comp. dep. fract., with laceration of brain, and escape of brain. Frontal, extensive. Opening 1½ in. diam. and circular.	Comp. dep. fract., with laceration of dura mater, and escape of brain. Frontal, extensive. Opening 1½ in. diam. and circular.	7th day. Consistent with brain substance.	Intermittent pulse only symptom noticed. Possible throughout, with nothing unfavorable.	VS. Tert. Anisotony. Died 24th day. Intellect clear.	Compression, excision, and caustics. Hernia reappeared after ablation.	None.	Hospital Records, 1840. Case 38. Dr. Hoffman.
M. 15	Thrown from a wagon. Left os parietale and frontal.	Comp. dep. fract., with laceration of dura mater, and escape of brain. Frontal, extensive. Opening 1 inch.	7th day. Size of brain increased. Consistent with brain substance.	Considerable vascular excitement. But little central disturbance.	VS. Recovery in about 2 months. Intellect clear.	Compression used, with no aggravate symptoms.	None.	Hospital Records, 1842. Case 3. Dr. Buck.
M. 24	Sick of a horse. Right os parietale.	Comp. dep. fract., with laceration of dura mater, and escape of brain. Frontal, extensive, and comatose.	7th day. Size of brain increased. Consistent with brain substance.	Pulse natural. Left side paralyzed. Intellect intact.	VS. Recovery in about 2 months. Intellect clear.	Excision, and arg. nit. applied to the base of the tumor. Brain soft and pulpy.	Pus in sulci by side of hernia, and beneath it an abscess found. Brain soft and pulpy.	Hospital Records, 1843. Case 4. Dr. Hoffman.
M. 22½	Falling from a horse. Right os parietale.	Comp. dep. fract., with laceration of dura mater, and escape of brain. Frontal, extensive, and comatose.	10th fr. injury. Consistent with brain substance.	Preceded by paralysis of left side, and by symptoms of compression. No change vultions.	VS. Recovery in about 2 months. Intellect clear.	Cold to head the only treatment mentioned.	None made.	Hospital Records, 1848. Case 39. Dr. Hoffman.
M. 27	Kick of a horse. Left os frontis.	Comp. dep. fract., with laceration of dura mater, and escape of brain. Frontal, extensive, and comatose.	7th day. Size of brain increased. Consistent with brain substance.	Preceded by paralysis of left side, and by symptoms of compression. No change vultions.	VS. Recovery in about 2 months. Intellect clear.	Excision, and pressure by lead plate. No ill effects from compression.	A large quantity of grayish blood in the left hemisphere, which was softened.	Hospital Records, 1849. Case 40. Dr. Rodgers.

M. 27	By a falling stone (comp. dep. fract., with 7th day. Protru- sion of dura mater 1 1/4 inches. Fract. very extensive.)	An attack of vomiting preceded (all to head and the hernia. Pulse frequent, and perspiring. Died on patient very restless and delirious. 6th day. Oozing of blood was present. No paralysis.	Locally nothing.	A large clot, 3/4 inch in Hospital Records, thickness, was found out- Case 41. side the dura mater. Right Dr. A. C. Post. hemisphere softened. Frac- ture extended to base.
M. 36	Blow from a ham- mer. Left parie- tal region.	Comp. dep. fract., with 3d day. Size of a laceration of dura mater Madeira nut, and of brain, latter to depth of softened brain. of 1 inch. Free hemor- rhage.	Frequent pulse. Stupor, and other symptoms of compression.	A clot found between brain Hospital Records, and dura mater. No pus. 1850. Case 2. Dr. left hemisphere pulpified &c. Buck. 1 1/2 inches in depth at seat of injury.
M. 22	Blow from a shoe. Parietal re- gion.	Comp. depressed fract., 6th day. 4 1/2 inch. with laceration of dura long by 2 1/2 side. mater and brain. The lat. Softened brain matter pulpy.	Preceded by frequent pulse and delirium. Pain in head. Sym- ptoms not relieved by leeches. Brain lysis of left side of body and face. Died 4th day. Comatose.	Large quantity of febril Hospital Records, pus between dura mater 1850. Case 1. Dr. ligature. Slight tumor and brain, which latter (Gordon Buck. thick. Pressure pro- duced stupor, insensi- lymph—H. had receded.
M. 22	From a blow. Right os frontis.	Comp. depressed fracture. 19th day. Pro- trusion of dura mater lacerated, crusted 1 1/4 inch. Opening 3/4 inch in diam- eter.	Before hernia appeared intellect clear. No paralysis. Great pain purging. Died 23d in head, to which succeeded para- lysis of left side of body and coma.	Adhesions, pus found be- Hospital Records, tween membranes. Ante 1851. Case 42. rior lobe of right hemis. Dr. A. C. Post.
M. 24	Fall fr. a height. Right parietal re- gion.	Fracture with depression. 4th day. No de- (Nothing else stated.) scription. Opening size of a silver dollar.	Preceded by febrile excitement. Delirium. Frequent pulse, stupor, and twitches of face, and para- lysis of right side of body. No change after hernia appeared.	None made. Hospital Records, 1851. Case 43. Dr. R. K. Hoff- man.
M. 30	Fall fr. a height. Left os frontis.	Simple comminuted fract. 15th day. "Re- (dep'n not noted). Dura sembled brain." mater not wounded. Open- ing over 1 sq. inch.	Discovered on opening an abscess at seat of injury. There was great disturbance of the system from other severe injuries, as frac- tures of both arms.	A clot found on outside of Hospital Records, dura mater, and that 1852. Case 44. membrane was lacerated. Dr. G. Buck.
M. 24	Struck by a stone. Left parietal re- gion.	Comp. fract. with depres- 10th day, or 3d sion to depth of 1 1/2 inch after operation. (Nothing else stated.) No description.	Preceded by symptoms of compres- sion, which were relieved, by two days. Ex- plaining, and by convulsions which by dead bone be- stopped when it appeared. Did not well after which.	Hospital Records, 1852. Case 45. Dr. T. M. Halsted.
M. 12	Fall from a R. R. car. Right parie- tal region.	Comp. dep. fract. dura 6th day. Size of mater, but brain felt soft. 3rd moraine and ened under it. Opening 3/4 inch cerebral 3 by 2 inches. Depression subse- quent amounted to 3/4 inch.	On 5th day paralysis of left side of face to head, ke- died on 11th day. from latter. Great pus, especially the right, disposition to protrude which was softened and sion when pressure disorganized around seat of hernia.	Both hemispheres and Hospital Records, excision. No ill effects base covered with creamy 1853. Case 46. from latter. Great pus, especially the right, disposition to protrude which was softened and sion when pressure disorganized around seat of hernia.
M. 14	Fall fr. a height. Right os frontis.	Simple depressed fract. 4th day. 5th day with laceration of dura it broke down, mater, and a clot beneath both it and change noticed after hernia ap- peared.	Preceded by delirium, feb. excite- ment, frequent and full pulse. No and cold to head. Died on 6th day.	No necropsy allowed. Hospital Records, 1853. Case 47. Dr. Halsted.

A Table of Thirty-One Cases of Hernia Cerebri, occurring in the New York Hospital from 1837 to 1859. — Continued.

SEX AND AGE.	MORDEY OF YRO-LEWNE SEAT OF INJURY.	LESSIONS.	DATE OF APPEAR-ANCE, AND CHARACTER.	VASCULAR AND CEREBRAL SYMPTOMS.	GENERAL TREAT-MENT. THERM-NATION.	LOCAL TREATMENT.	POST-MORTEM APPEAR-ANCES.	REFERENCE. SURGEON.
M. 17	Falling from a car in motion, striking a projection. Left occipital region.	Comp. depressed fracture of dura mater, with laceration of brain, and escape of brain matter. Fract. of several fragments stances, sloughy, and styled "extensive."	14th day. Size of a small orange. Cerebral substance, sloughy.	Preceded by febrile excitement, with accelerated pulse. Paralysis of right arm, right arm. Mild clear. Succeeded 41st day, coma by a less rapid pulse; glossal paralysis and coma.	None, except febrile excitement of rigors. Died on 41st day, coma.	Com'n by zinc plate, and ligature. Argent nit. covered with pus at post. part; its substance softened. Ventricles distended with serum.	Superior surf. of left hemisphere was collapsed, and covered with pus at post. part; its substance softened. Ventricles distended with serum.	Hospital Records, 1854. Case 48. Dr. Buck.
F. 4	Gunshot wound. Os frontis.	Compound fract., with depression and protrusion of bone, of broken bone. Opening size of a brown and sloughy bullet, which was increased by the trephine.	34th day. "Quite a large size of a brown and sloughy bullet, which was increased by the trephine."	Accelerated pulse, disturbed intellect. Paralysis of right arm, preceded the hernia, from the 24 day, then convulsion of sound side.	Cold to head, low diet and purging. Died on 40th day.	Locally nothing.	Abscess holding 3 1/2 j. of pus, communicated with the wound by the track of the shot. Brain on that side softened. Fract. also of os occipital.	Hospital Records, 1854. Case 49. Dr. Cheesman.
M. 28	Blow from an axe. Left occipito-parietal suture.	Comp. dep. fract., with laceration of dura mater. One fragment was of the size of quart. dol.	17th day. Called "hernia of the size of the brain."	Pain in head, slow pulse, paralysis of opp. side, with other symptoms, and of compression.	Blisters, purging, calomel, and by calomel. Died on 28th day.	Excision, hernia repaired; then pure nitric acid.	No necroscopy made.	Hospital Records, 1854. Case 50. Dr. Chresman.
M. 21	Fall fr. a height. At vertex.	Comp. dep'd fract., with wound of dura mater, and escape of brain. Opening was semilunar, and 2 inches long. Complicated with fract. of the pelvis.	8th day.	Had paralysis of right side and convulsions before hernia appeared, which increased until termination. Not much arterial excitement either before or after hernia appeared.	Died on 26th day.	Excision and caustics freely. Hernia continued to protrude after excision.	No necroscopy made.	Hospital Records, 1855. Case 51. Dr. Jno. Watson.
M. 35	Fall fr. a height. Right os frontis.	Comp. depressed fracture, with laceration of dura mater, and escape of brain matter. Opening in skull wound. Small in diameter. 1 1/2 inches in diameter.	4th day. A polypoid tumor in skull wound. Small in size.	Appearance of hernia coincident with symptoms of compression in Paralysis of right side came on.	Calomel, cathartics. Died on 8th day.	Moderate pressure.	Abscess in brain directly below hernia; also a small one in 1/2 hemisphere. Pus between membranes.	Hospital Records, 1855. Case 52. Dr. T. M. Markoe.
F. 8	By a falling brick. Vertex.	Comp. dep. fract., with wound of longitudinal sinuses. Opening in skull 1 by 1 1/2 inches.	7th day.	Preceded by chills, spasms, and strabismus of left eye, which continued after hernia appeared, with also paralysis of right side.	Cups, cold to head, cathartics, and calomel. Died on 19th day. Coma.	Locally nothing.	A deep abscess at seat of fracture and softening of brain in vicinity. Another abscess post. to left, and clot at base of brain.	Hospital Records, 1855. Case 53. Dr. Markoe.
M. 35	Blow from a fall ing stone. Left parietal region.	Comp. dep. fract., with laceration of dura mater, and escape of brain matter. The fract. was about 2 1/2 inches long.	7th day. Size of little fin-pulse, and slight paraplegia. Sue disappeared 22nd day, in 18 days.	Preceded by pain in the head, rapid pulse, and slight paraplegia. Sue disappeared 22nd day, in 18 days.	Died 26th day. Coma.	Firm pressure employed, and hernia disappeared in 10 days. Probably the d. mater did not give way.	Pus in large quantity bet'n membranes of left side. Brain on that side soft. D. m. only abraded; hernia had not broken through it.	Hospital Records, 1856. Case 54. Dr. Watson.
M. 31	Blow from a hammer. Left parietal region.	Comp. dep. fract., with laceration of brain and escape of brain matter. Brain soft, and leathery-looking.	11th day. Size of little fin-pulse, and slight paraplegia. Sue disappeared 22nd day, in 18 days.	Preceded by accelerated pulse and convulsions.	Bleeding and purging. Died on 18th day.	Locally nothing.	Hernia retracted. Brain was softened.	Hospital Records, 1857. Case 6. Dr. Buck.

M. 14	Blow from flying capstan. Right temporal region.	Comp. dep. fract., with laceration of dura mater and brain, with escape of latter. Fracture "extensive."	Oblong. Pulse rapid and quick. Great rest. Cold to head and temples. Skin hot. Respiration stimulants. Died 31 day.	Great rest. Cold to head and temples. Skin hot. Respiration stimulants. Died 31 day.	Locally nothing done.	Inspection only allowed. The dura mater was lacerated some 2 or 3 inches. Dr. W. Parker.	Hospital Records, 1857. Case 55.
F. 23	Blow with hatchet. Left frontal.	Comp. dep. fract., with laceration of dura mater.	13th fr. accident. 3rd day from operation. Broken down brain. Toward termination of the hernia scabbed over.	Before operation symptoms of compression were present, and which they were slightly relieved. Hemiplegia of right side, and convulsions throughout case.	Locally nothing.	At operation the d. mater. was found thickened and lacerated. Two-thirds left hemisphere was broken down into a pinkish mass, forming an abscess. Pus found in circulation.	Hospital Records, 1858. Case 56. Dr. Markoe.
F. 22	Blow from hatchet. Left parietal region.	Comp. dep. fract., with laceration of dura mater and brain.	10th day. Dark colored size of hickory nut. Composed of exuberant granulations.	Preceded by pain in head. Paralysis of arm and tongue.	Argent. nit. in sub-Recovery 61 days, stance, and slight compression.	Hospital Records, 1858. Case 32. Dr. Markoe.	
M. 4	Kick of a horse. Os frontis.	Comp. dep. fract. Dura mater intact.	5th day. Tumor of a mottled m. brown color. Covered with granulations.	Accelerated pulse, pain in head. Shrieking, with clenched hands, both before and after hernia appeared. Vomiting increased protrusion very much.	Nothing locally.	No necroscopy.	Hospital Records, 1858. Case 7. Dr. W. H. Van Buren.
M. 32	Struck by a conch shell. Right parietal region.	Comp. dep. fract., with laceration of dura mater and brain, with escape of latter.	9th day. Pulsation of a mottled m. brown color. Covered with granulations.	Inflammatory symptoms present. Vascular system much excited. Toward termination, however, p. blisters, with was 52. 2d day from operation 32d day, coma had 2 convulsions, which did not lose recur on opening the wound.	Nothing locally.	Much congestion of membranes. Just below cranial opening, an abscess with firm walls was found on the brain, and whole right hemisphere was softened.	Hospital Records, 1858. Case 17. Dr. Halsted.
†M. 26	Buried by an embankment. Left parietal region.	Contused wound of scalp. Potts' puffy tumor. Symptoms of compression. Trephined. Also comp. fract. of left leg.	31st day, 3d from operation. Size of hickory nut.	Symptoms of comp'n came on, accompanied by epileptiform convulsions, for which he was trephined. D. m. was thickened, and there was effusion under arachnoid. Was relieved for a short time by the operation.	Nothing done.	Brain was filled with abscesses. 3 principal ones. 1st, one penetrated into right ventricle, and communicated with the cranial aperture. Another abscess was found in centre of right hemisphere. These abscesses had pyogenic membranes. Brain around them was much softened.	Hospital Records, 1858. Case 57. Dr. Parker.

* Quoted in Dr. Buck's Essay on this subject, and introduced into statistics.

† This case was not obtained in time to be incorporated in the statistics.

